

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (currently amended): A method for determining a property of a portion of a structure having a first layer and at least one underlying layer in contact with the first layer, the method comprising:

heating a region of the first layer [using a first beam of] power modulated at a frequency that is predetermined to be sufficiently low to ensure that temperature of said region varies substantially linearly relative to said modulated power;

wherein the first layer comprises at least one crystalline phase [in] from among a plurality of crystalline phases of a compound of a material [that comprises] comprised in said underlying layer, said crystalline phase depending on at least one process condition used in forming the first layer by annealing; and

wherein the first layer [transmits at least 10% of] partially absorbs and partially transmits the power [of the first beam incident thereon];

measuring a signal indicative of a change in reflectivity of said first layer due to a corresponding temperature change in the first layer caused by said heating;

using said measured signal to determine an electrical conductive property of said first layer, said electrical conductive property depending on crystalline phase.

Claim 2 (previously presented): The method of Claim 1 wherein:

the predetermined frequency is smaller than a maximum frequency beyond which nonlinearities in temperature response of said region become measurable.

Claim 3 (original): The method of Claim 2 wherein:

said maximum frequency is approximately 100 kHz.

Claim 4 (currently amended): The method of Claim 2 further comprising:

changing a process parameter used in fabricating said structure in response to at least a predetermined change in said [second power] measured signal in multiple regions across said structure.

Claim 5 (original): The method of Claim 2 wherein the predetermined frequency is less than:

$$\frac{k}{2\pi\rho c\lambda^2}$$

wherein:

k is thermal conductivity of the region;

ρ is the density of the region;

c is the specific heat; and

λ is wavelength of a wave solution to a diffusion equation for heat transfer from the region.

Claim 6 (original): The method of Claim 2 further comprising:

comparing the power obtained from said measuring with a predetermined limit.

Claim 7 (original): The method of Claim 1 wherein:

said measuring includes using a lock-in amplifier tuned to said predetermined frequency.

Claim 8 (currently amended): The method of Claim 2 wherein:

the region of the first layer is heated by use of a first beam and said measuring comprises use of a second beam; and

said measuring also [includes] comprises using a narrow band filter tuned to the wavelength of said second beam to filter out at least another portion of said first beam reflected by said region.

Claim 9 (original): The method of Claim 1 wherein said region is hereinafter referred to as "first region", the method further comprising:

focusing the first beam on a second region different from said first region;
and

repeating said measuring in said second region.

Claim 10 (original): The method of Claim 9 further comprising:

changing a process parameter used in fabricating said structure if the power measured in said region is nonuniform relative to the power measured in said second region.

Claim 11 (currently amended): The method of Claim 2 wherein:
the region of the first layer is heated by use of a first beam and said measuring comprises use of a second beam of a second power; and
the second power is sufficiently low to ensure that less than 10% of heat generated in said region is due to the second beam.

Claim 12 (original): The method of Claim 1 wherein:
wherein the predetermined frequency is sufficiently low to ensure that an instantaneous temperature in said region is approximately equal to another temperature obtained in said region by heating with an unmodulated beam having a power equal to an instantaneous value of said first power.

Claims 13-14 (canceled).

Claim 15 (currently amended): The method of Claim 1 wherein:
the first layer [includes] comprises a silicide as said compound.

Claim 16 (currently amended): The method of Claim [1] 15 wherein:
the [first] underlying layer [is] comprises polysilicon.

Claim 17 (currently amended): The method of Claim [1] 15 wherein:
the [first] underlying layer [is polysilicon with a silicided top surface] comprises a silicon substrate.

Claim 18 (original): The method of Claim 1 wherein:
the first layer is one of polysilicon and polycide, and said at least one underlying layer is an insulator layer located between said first layer and an underlying substrate.

Claim 19 (currently amended) An apparatus for evaluating [a] an annealed structure, said apparatus having a first line to be coupled to an annealing apparatus and a second line to be coupled to a metal formation apparatus, said apparatus comprising:

a first source of a first beam of photons having a first power modulated at a frequency sufficiently low to ensure transfer of a majority of heat from a region of said annealed structure illuminated by said first beam by diffusion;

a second source of a second beam of photons having a second power sufficiently low to ensure that an instantaneous temperature in said region is approximately equal to another temperature obtained in said region by heating with an unmodulated beam having power of an instantaneous value of said first power; and

a photosensitive element located in a path of a portion of said second beam after reflection from said region, said portion being modulated at said frequency of modulation of said first beam; and

a computer coupled to said photosensitive element and programmed to determine if power of said portion of said second beam reflected by said region is at least greater than a predetermined power and if so the computer driving a signal active on the first line to the annealing apparatus or on the second line to the metal formation apparatus or both.

Claim 20 (canceled).

Claim 21 (currently amended): A method for evaluating a wafer, the method comprising:

focusing a beam on a partially transmissive electrically conductive layer in said wafer, the partially transmissive electrically conductive layer comprising at least one [of] silicide among a plurality of silicides, whose roughness is a function of crystal phase, and wherein said one silicide is formed by annealing;

measuring reflectance of said beam from said layer; and

correlating said reflectance from said layer to a previously determined value, said previously determined value having been obtained from a previous reflectance measurement on a reference wafer.

Claim 22 (original): The method of Claim 21 further comprising:

performing a plurality of measurements of reflectance along a line, to identify variation in a property of said layer along said line.

Claim 23 (new): The method of Claim 21 wherein:

the partially transmissive electrically conductive layer has an optical absorption coefficient α that is several orders of magnitude greater than the corresponding absorption coefficient of a material that is underlying the partially transmissive electrically conductive layer in the wafer.

Claim 24 (new): The method of Claim 21 wherein:

the wafer comprises an underlying layer of polysilicon underneath the partially transmissive electrically conductive layer.

Claim 25 (new): The method of Claim 21 wherein:

the wafer comprises an underlying layer of crystalline silicon underneath the partially transmissive electrically conductive layer.

Claim 26 (new): The method of Claim 21 wherein:
the partially transmissive electrically conductive layer comprises silicon germanium.

Claim 27 (new): The method of Claim 21 wherein:
the partially transmissive electrically conductive layer comprises a metal compound

Claim 28 (new): The method of Claim 27 wherein:
the wafer comprises an underlying layer beneath the partially transmissive electrically conductive layer, and the underlying layer comprises a semiconductor material.

Claim 29 (new): The method of Claim 21 wherein:
the partially transmissive electrically conductive layer is less thermally conductive than an underlying layer comprised in said wafer.

Claim 30 (new): The method of Claim 1 wherein:
the first layer has an optical absorption coefficient α that is several orders of magnitude greater than the corresponding absorption coefficient of said underlying layer.

Claim 31 (new): The method of Claim 1 wherein:
the first layer comprises silicon germanium.

Claim 32 (new): The method of Claim 1 wherein:
the first layer is less thermally conductive than the underlying layer.

Claim 33 (new): The method of Claim 1 wherein:
the underlying layer comprises a semiconductor.

Claim 34 (new): The method of Claim 33 wherein:
the first layer comprises a metal compound.

Claim 35 (new): The method of Claim 34 wherein:
the metal compound is nickel silicide.

Claim 36 (new): The method of Claim 34 wherein:

the metal compound is cobalt silicide.